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SEASONAL CHANGES IN PROTEIN AND MORPHOLOGICAL COMPOSITION
OF THE BLOOD OF NORTHERN REINDEER (Sezonnye izmeneniya
belkovogo i morfologicheskogo sostava krovi severnykh
olenei')

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Aspirant, NIISKh.

Extreme North

SEASONAL CHANGES IN PROTEIN AND MORPHOLOGICAL COMPOSITION
OF THE BLOOD OF NORTHERN REINDEER

The literature contains very scant data pertaining to the study of protein and formed blood elements in the reindeer in health and those affected with necrobacillosis, and in mouth and foot disease (N.M.Klemov, E. A. Vasileva, V.I. Shilnikov 1958; Yu. P. Kvitkin, 1961 and others). However, the studies of the above authors were confined to a few animal groups and the seasonal protein variations were not investigated at all.

During 1961-62, a study was undertaken to determine the seasonal variations in serum proteins and blood morphology of clinically healthy reindeer of different age and sex groups. Forty five such animals were studied.

Following measurements were made on the blood serum: residual nitrogen by the method of Asel; total protein content by refractometry and paper electrophoresis of serum proteins. The clinical blood tests were performed by the usual methods.

Albumin and globulin were discovered in the blood serum of the reindeer. The globulin is subdivided into α , β and γ globulins. Sometimes 5 to 6 subfractions of globulins were discovered in the electrophorogram.

The proteinogram of reindeer's blood showed a high content of protein in the late summer - autumn period, and a low content in the winter - spring (see Table 1).

Table 1

The seasonal changes in protein and its fractions in the blood serum of the northern reindeer. (Average results).

Indices of biochemical analysis	Season of the year			
	Summer	Autumn	Winter	Spring
Residual nitrogen (in gm %)	32.60	32.51	40.15	37.29
Total protein (gm %)	6.49	7.60	6.10	5.75
Albumins (gm %)	3.61	3.96	3.40	3.35
α -globulins (gm %)	0.52	0.70	0.50	0.43
β -globulins (gm %)	0.83	1.09	0.79	0.68
γ -globulins (gm %)	1.51	1.37	1.40	1.28
Coefficient A/G	1.32	1.13	1.31	1.45

The residual nitrogen in the reindeer's blood is greater in the winter period than in any other season. This, perhaps, is due to the rapid protein decomposition as a result of the non-availability of protein in food during this season.

The amount of gamma- globulin is minimum in the new born reindeer (0.13% on the first day). This, along with other globulins and total protein, gradually increases and becomes 2.11% at the age of 3 months.

The blood proteinogram of reindeer is characterized by the high content of protein in the castrated male (7.14 gm %) and a low content in normal males (6.25 gm %).

It was observed that the proportion of protein in the blood serum conserved by freezing in boric acid does not change significantly over a period of 2 to 2.5 months.

The morphological blood picture of reindeer also undergoes seasonal variation (see Table 2).

In the summer-autumn season, a high content of formed elements and hemoglobin are observed as compared to the composition of these components during winter-spring period. The high indices are observed in blood during October and low ones in June.

The leucocyte changes in reindeer blood are characterized by lymphocytosis during summer-winter period and granulocytosis during winter-spring period. The young neutrophils are observed in summer but are totally absent during the rest of the season. The coefficient of seasonal changes in blood of \angle ^{reindeer} is connected with sex, age and individual characteristics of the animals. The high content of erythrocytes (8.95 million per 1 cubic millimeter) and hemoglobin (15.06 gm %) was observed in the young animals rather than in older ones.

The leucocyte count increases with the growth and aging of the animals.

Table 2

The blood picture of the northern reindeer in different seasons. (Average results)

Indices of hematological investigation		Season of the year			
		Summer	Autumn	Winter	Spring
Erythrocyte in cubic millimeters (in million)		7.0	7.69	7.30	6.80
Leucocytes in cubic millimeters (in thousands)		5.32	6.47	6.04	5.27
Hemoglobin (gm %)		12.60	13.29	12.55	20.22
	B	0.22	0.32	0.20	0.26
	E	7.0	10.62	5.0	3.53
leucocyte count (in %)	Neutrophils				
	Juvenile	0.09	-	0.02	-
	Band forms	3.00	2.0	3.55	3.3
	Segmented forms	37.28	36.05	51.00	51.26
	L	52.36	49.00	40.16	41.0
	M	0.34	1.0	0.2	0.3
	Plasma fraction	0.52	1.11	0.25	0.51

Conclusions

- 1) Hemoproteinogram of the reindeer is higher during late summer - autumn periods and lower during winter and spring.

(2) Much higher protein content in the blood serum is observed in the castrated males, males capable of reproducing and in heifers in all the seasons of the year.

(3) The highest protein level in blood serum and globulin fraction in reindeer of different age and sex groups is observed during August-September months.

(4) In the spring-summer period it is necessary to use complex zootechnic and veterinary measures in reindeer rearing so as to raise their immunological resistance.

(5) Hemoproteinogram of the clinically healthy reindeer can serve as an additional criteria in the evaluation of general health conditions of these animals.

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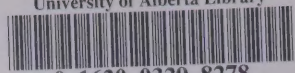
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